WEDGES

The specifications require all permanent anchorage devices for post-tensioning to develop at least 95% of the guaranteed ultimate tensile strength of the prestressing steel. The anchorage systems develop the required strength through the interplay between wedges and prestress steel, and between the wedges and anchorage plate. Characteristics which affect this interplay are wedge angle, wedge teeth, type of steel, type of heat treatment, and general strand configuration in the anchor plate.

The care, cleanliness, lubrication, surface condition and finish also affect the efficiency of wedge systems. All manufacturers have quality control procedures which should eliminate obvious manufacturing defects. On-the-job care is left to the discretion of the individual field crews. The Contractor must use wedges that have been approved by the Translab. Pulling wedges may not be used as permanent wedges.

The wedge holes of the anchor block should be clean prior to placing the permanent wedges. Sand or foreign particles located in the wedge area of the anchor block can cause the wedges to fail.

JACKS

Jacks used in typical post tensioning systems are generally the center hole variety. (See Figures 4 and 5 for an example).

Prestress jacks have more wearing surface, longer jack stroke, and packing than conventional jacks of the same capacity. This increases the potential of variations in the accuracy of the applied force. Other conditions which may affect accuracy and efficiency of hydraulic units are: Use of unfiltered oil, exposure of the system to dust or grit, eccentric loading, type of packing, ram position, oil temperature, hydraulic valves, ram and packing maintenance, and readout equipment. Care and effort must be exercised to attain accuracy from the jacking equipment.

A condition which must be considered when using hydraulic jacks is hysteresis. Hysteresis is an energy loss due to a hydraulic pressure change inside the jack, causing inaccurate load values when the ram pressure is static or decreasing. An increase of hydraulic pressure also causes an energy loss, but this loss is taken care of by calibrating the jack and pressure gage with a load cell during this increase of pressure.

Improper gage readings occur when the ram is fully extended and the hydraulic pressure is dissipated against the jack case. This condition can cause harm only if it damages the jack or gage and if the gage reading is mistaken for actual tendon stress,

The stroke should be monitored by the contractor, Typically jacks have a 12 inch stroke and if the ram is extended beyond this limit the jack will be damaged.

Fittings and valves are a common source of problems. The fittings are equipped with spring-loaded, self-closing ball valves, which occasionally will not open when joined together. If this occurs anywhere except in the gage line, the system will not work and a high gage reading will show immediately. If the stuck valve is in the gage line, everything will work except the gage. Valves and fittings that leak or will not hold the load should be replaced. When fittings are replaced it is imperative that high pressure type fittings are used. (e.g. Schedule 80) If you have any questions concerning high pressure fittings contact the Trans Lab.

In general, jacks are about ninety-five percent efficient, but actual efficiency will vary depending on the age and condition of the jack. Suspect any calibration chart which shows jacking forces much greater than ninety-five percent of pressure times piston area. Load cells and pressure gages are available to check any questionable equipment.

Department policy recommends that the jacks should be calibrated yearly. If it has been more than one year since the last calibration, contact the Transportation Laboratory in Sacramento or Office of Structures Construction. The Structure Construction Computer Bulletin Board has current information for jacks used in all State approved stressing systems.

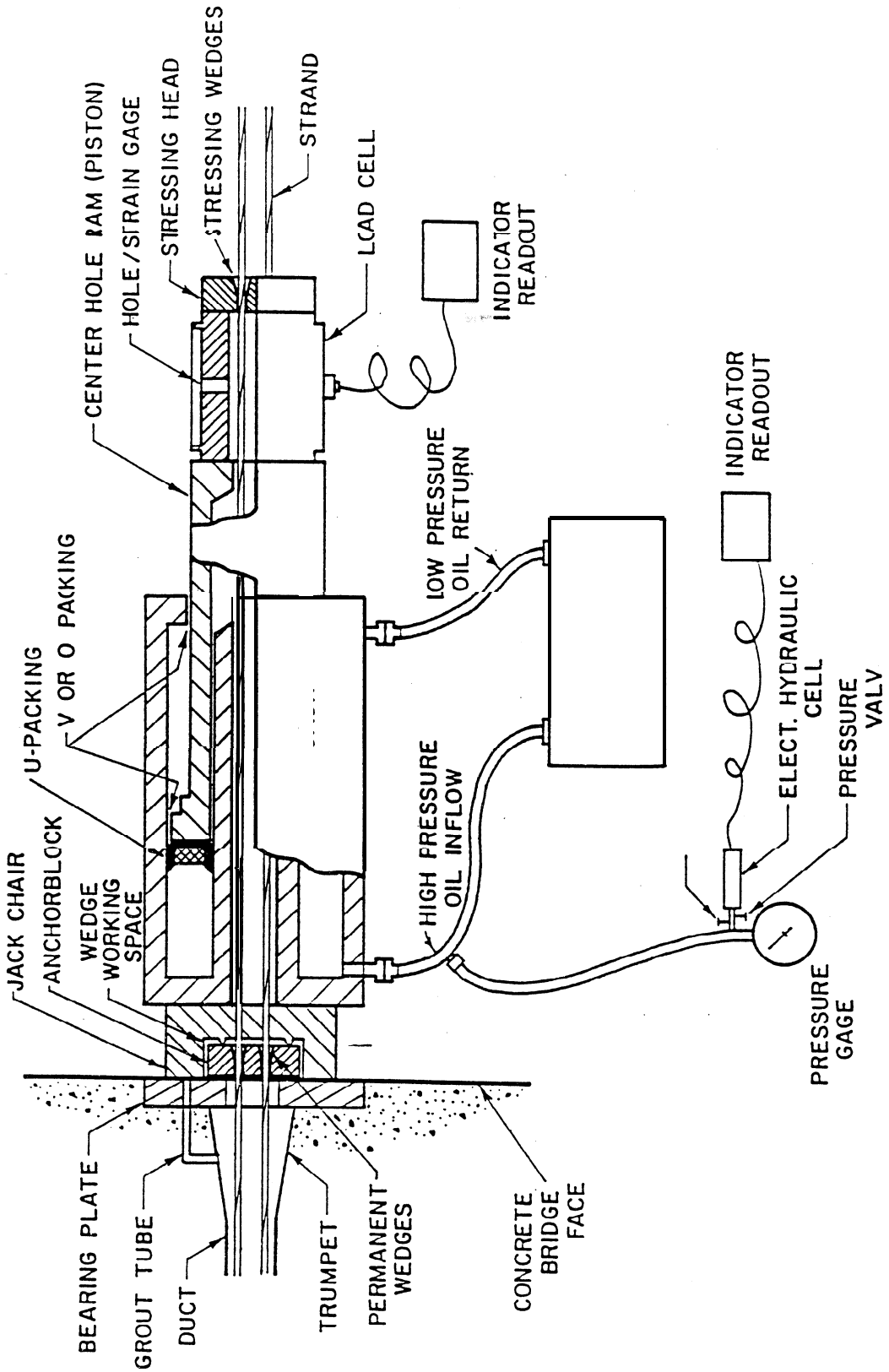

FIGURE 4 TYPICAL POST TENSIONING SYSTEM

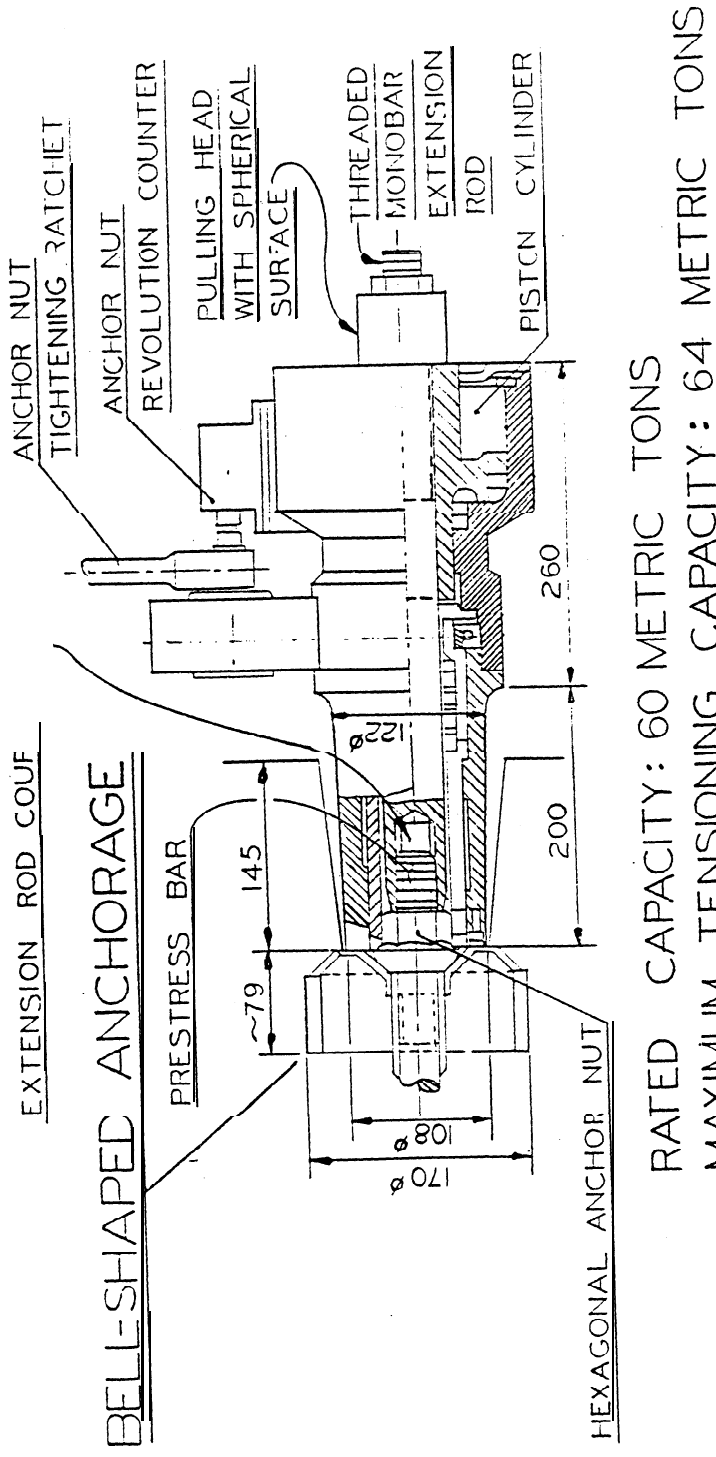

FIGURE 5 DYWIDAG 60 TON JACK